

AN INTERIM REPORT ON THE CONFERENCE

Harold D. Lasswell

Yale University, New Haven, Conn.

This volume, and the conference from which it grew, is a step in the development of the World Academy of Art and Science and the World University, established under its auspices.

Our first aim has been to present a map of the recent and prospective development of knowledge in the physical, biological, and cultural sciences. Hence, the wide variety of papers herein cover the space and earth sciences; biological and medical sciences; physical sciences and engineering; anthropology, sociology, and psychology; economics, political science, and law.

The second and ongoing aim was an examination of social consequences and policy implications of knowledge for the needs of man. And this called for a different kind of procedure than is usual in scientific gatherings and scholarly books. Policy is *value-oriented*. How do we clarify the value goals of man?

Policy is *future-oriented*. How are the value goals likely to be affected by knowledge?

Policy is *action-oriented*. How can general goals be specified in distant, middistant, and immediate objectives?

Policy is *creation-oriented*. How can the creative innovations be found that illuminate goals and paths through the future?

Policy is *contextually oriented*. How can we find procedures that will help us to comprehend the impact of every fragment of knowledge in reference to other fragments within the broad contours of the changing map of knowledge? And how are we to relate knowledge of technical matters to administrative and legal institutions, and with effective support?

Policy is *involvement-oriented*. How can scientists become more effective in the task of making relevant knowledge available in the decision processes of mankind at every level?

The consideration of such questions calls for nontraditional procedures. We made a start at the Conference by dividing into Working Groups responsible for giving policy consideration to a set of important questions. This approach, of course, is reflected in the organization and structure of the present volume.

How does one divide up the big questions? We did it this way: What should be our policy goals and strategies toward "Cultivating Resources"—outer space, atmosphere and surface, oceans?

Or "Population, Health, and Family"—control of population (numbers and quality), environmental control, and public health?

Or "Scientific Knowledge, Education, and Communications"?

Or "Economic and Social Strategies"?

Or "Decision Processes"—conflict resolution and the control of war, the organized planet, human rights, and individual participation?

Each Working Group felt the constraints of time, of new cross-disciplinary colleagues, and of different estimates of the future. The more immediate the objective the more difficult the choice of priorities, the evaluation of cost and benefit, the estimation of the risks.

Obviously, the working papers of the Conference as presented here must be understood as provisional drafts. Plainly, the consensus is that these Working Groups and their like should constitute the nucleus for the continuing commissions of the World University of the World Academy.

This is precisely the principal point of the Conference. Continuing commissions are essential to the work of the University and the Academy, as they are to the general role of science in helping to formulate policies that implement man's needs and values. The commissions are able to count on the active participation of individual scientists in more than 80 countries. They can now see more definitely what must be done at every level of action.

If any lesson has been re-enforced by the experience of the Working Groups, it is the importance of continuity. Why continuity? It is essential if we are to change ourselves into modern men. Continuity is essential even to the revision of our abstract rhetoric of value goals and needs. Our statements are centered on man. Continuing commissions, committees, seminars are places where an *occasional* challenge, at least, can be uttered in the name of *all* life, not simply of human life. How indeed do we conceive of the limits of "man" or even of "life" in a world where the traditional boundaries in the universe of events are fading as the map of knowledge broadens and deepens? We are becoming accustomed to the problem of "human" rights for hypothetical machines. Less esoterically, we need more than an occasional reminder of "Human Rights and Responsibilities" for life and environment.

Continuity is essential if we are to become future-oriented. Continuing commissions and seminars are necessary if we are to be jarred from the isolated consideration of the path of a knowledge fragment to the reception of frequent exposure to the processes of which it is part. This is beneficial to the development of knowledge; it is decisive for the future of man. Unless our value commitments are respecified in the light of future possibilities, they are ambiguous maps for the path of policy. We need to be continually and explicitly reminded that the gap between man's traditional aspirations depends more on constraints within our decision processes than on the expansion of our knowledge.

Small-group continuity is essential to action. Scientists need time to challenge each other concerning objectives—long-range, midrange, immediate; objectives must be clarified in terms of time. For instance we are challenged to think of the implications of a prediction that the rate of scientific knowledge in relatively developed countries is slowing down while the rate in developing countries is going up. Also, consider the implications of the assertion that such "world languages" as English are declining (one percent a year) and that the use of localized languages will grow. Priorities, cost-benefit, and risk estimates change as these action-related assertions are exposed to the discipline of the seminar process.

Commission continuity is imperative for creativity. The occasional prod of a mutual challenge of a supposedly "insolvable" policy problem is a means to immediate or delayed creativity. We are often told that only a few scientists will be deeply committed to the consideration of social consequences and policy implications. Can we think of better means of inducing our scientific and other institutions to change their incentive systems so that more scientists choose new, cross-disciplinary, and "science policy" or "policy science" careers? We cannot afford to depend on the occasional scientist to gravitate into the position of intermediary between scientist and scientist and between scientists and the rest

of society. Continuing commissions can create firsthand understanding of the appropriate intellectual tasks.

Continuity in the commissions and seminars is essential if the contextual orientation is to be kept alive. Unless a scientist is frequently—not rarely—confronted by competent colleagues who raise the question of consequences and implications, he will often happily regress to a private world. Granted that some cannot be and perhaps should not be expected to emerge from that world, the common interest of science and life requires that more be willing to do so. This means that commissions set a model and explore models that permeate the laboratories, observatories, field stations, universities of the globe. Context becomes clearer if we estimate the probable future of some event, including a strategic intervention in the policy process; then we appraise in future meetings the accuracy or inaccuracy of the estimate and consider how our inferences went right or wrong. We may have been too much affected by love or hatred for the New York Times, or CBS, or even the President.

Continuity is important for involvement. Commissions of fellow scientists can help to keep the scientist “honest” when he engages in the rough-and-tumble of public planning, promotion, and negotiation, or in any other decision activity. It is helpful when mixed commissions permeate the boundaries between specialized scientific and public decision-making operations.

We are engaged in an institution-building process. We view the Academy and World University as subject to the criteria appropriate to any institution. Are they likely to contribute distinctively and significantly to the shaping and sharing of the significant values and needs of man?

We are concerned with making a profound change in the strategies of individual and collective ways of thinking and doing. The man of tomorrow must be a contextual thinker. He must be problem-oriented. He must demand of himself that he discipline himself by participating in continuing activities that enable him to achieve his vast potential.

Continuing commissions are one among many lines of Academy or University activities that include centers of research and other devices of a university, dispersed on many campus locations. Having explained why continuing commissions are important and why each is not “just another committee,” we propose to explore all the promising procedures now at hand or capable of being invented, in changing the environment of commission members. We deliberately explore the promising “mixes” of discipline, experience in action, age, cultural background, and every other important variable. We intend to encourage many “wild” as well as “tame” means of realizing the information potentials of computer and instant-communication technology. If we experiment with stimulants or depressants other than the conventional ones, it will, of course, be done discreetly.

This Conference was a modest step, in rhythm with all who are willing to face the future with determination and personal discipline. We join with all who accept the burdens and opportunities of our place in the past and future of man.

PREGEL: The next speaker on our program is Prof. Arne Tiselius, one of the most outstanding scientists in the world, a Nobel Laureate and chemist.

After becoming a Doctor of Science in 1930, he was Professor of Biochemistry from 1938 to 1968, Chairman of the Swedish National Science Research Council from 1946 to 1950, President of the International Academy of

Pure and Applied Chemistry from 1951 to 1956, a member of the Science Advisory Council from 1936 to 1968. In 1947 he was named Vice-President of the Nobel Foundation and was its President until 1964. He has been head of the Royal Swedish Academy of Sciences since 1960. He presided at the Symposium in Stockholm in 1969, and the discussions that took place there are continuing now with our conference. A man of great wisdom, a great scientist. I am very happy to give you Prof. Arne Tiselius.

TISELIUS: Last September in Stockholm there was an interdisciplinary Nobel Symposium on a similar theme with the title "The Place of Value in a World of Facts." This round-table conference was in a way a forerunner of the present one, and we had the benefit and the pleasure of seeing among the active participants some of those present here, including some of those who have carried the burden of organizing the present meeting. In my opening remarks in Stockholm I said that what we would try to do there was something rather ambitious, perhaps even overambitious. The same perhaps may be said about the present conference, which is much bigger and also maybe more far-reaching in its aims. We have to remember, however, that the Creator used six days to create the world, and we have been allowed the same number of days here to set it right again.

Nevertheless, after having listened to discussions at this meeting, I am, to a certain extent, an optimist. Above all, I would emphasize that the mere fact that leading representatives of culture in its widest aspects have been willing to come together here in a very serious effort to review the situation is encouraging in itself—still more so because many such attempts are being made today all over the civilized world and still more are being planned. The press and general public are becoming increasingly aware of the imbalance in our conditions for living and even of the threat against our very existence, and there is a kind of murmur of protest going on that is developing into almost a roar. Even the man in the street feels, sometimes at least, that something must be done.

Let me say that what I miss in all this is a continuity and a coordination. There are too many scattered initiatives, some of them valuable, but too diffuse, and they lead, I am afraid, to very little action. Something must come out of all these discussions—some specific plans or recommendations for immediate action or for action in the very near future. Time is short, and it may even be necessary to put aside, for a while, what may happen in the year 2000. We have to channel all this active interest—all this enthusiastic good will and all relevant facts—to the decision makers, and we have to do it soon. In many cases I believe we have the necessary tools and the weighty arguments. But still it is not easy to get things going. Why?

Man is an irrational creature who reacts only slowly to ever-so-convincing and radical arguments. Is it that we should have to wait until the garbage is literally on our doorsteps? And I am not referring only to the problems of the environment. It is very encouraging that the United Nations has decided to organize a conference on the environment in Stockholm in 1972 on the initiative of the Swedish Government. This, as has been said during the present conference, may act as a magnet to attract the attention of governments and of different organizations and also of the general public to the urgent need for certain measures to be taken and certain agreements to be reached. I hope it will also indicate a way of coordinating much of the valuable work being done, for example, at the present conference and to provide a channel for the realization of at least some of the goals we have tried to set here.

In my opinion, the success of the Stockholm conference will depend largely on such preparative work. Several committees are already in action. A very important task for them is to collect and to review material that has come out of discussions such as we have had this week. This is an additional reason why we appreciate so highly the initiative from our hosts here. This conference is also, from that point of view, very timely indeed.

I said a moment ago that I believe we have the tools for immediate action, at least in certain fields. I cannot help opposing those who like to blame science and technology for many of the evils of the world today. I believe it should be stated most forcefully that even if we admit that such a criticism may sometimes be justified, we are convinced that whatever remedy we look for, whatever tools we hope to use, we will be entirely dependent on continued and intensified research for whatever we try to do. Not only specialized scientific research in its narrow sense, but rather research over the whole field of human endeavor and human existence in the closest collaboration between various disciplines.

It remains to me to express our warmest thanks to the organizers of this conference for giving us an opportunity to take part in a meeting that may become a landmark in our efforts to set the world right. We thank you and we wish you well.

* * *

PREGEL: Before we go further, I would like to say a few words about the help we received during the organization of this conference, and I would like first to thank my friend Serge Korff, who gave us a great deal of help, because, as you know, this conference is sponsored jointly by the American Geographical Society and the American Division of the World Academy of Art and Science.

The people who were in charge of organizing the conference were a very small group. I would like to express my great appreciation in the name of all the people who came to this conference, to John McHale, and I must include Mrs. McHale, because she did a tremendous job and was a great help.

A simple glance at the world surrounding us would convince anyone of the complexities of our life, complexities that are growing with every passing minute. The main problems arise from the speed with which science and technology are moving ahead. Not the structure of our society or the present system of education, nor even our psychology, is prepared for the drastic changes of the last 25 years. The famous dictum, "Gouverner, c'est prévoir"—to govern is to foresee—is certainly not characteristic of our time. The gap widening each day between social advance and the technological process creates a peculiar situation in which governing bodies have difficulties understanding the trends and the problems. They act in many cases—I should say in most cases—with old approaches, which are, of course, inefficient and dangerous.

In the Western world, which should be, in principle, better prepared to meet the situation than any other place in our planet, there are very few men of vision in government. We are still burdened by the legacy of conventional oratory, sometimes demagogic and sometimes just inadequate. Mainly this is because of the composition of parliamentary bodies consisting of professional politicians and lacking in representatives of the scientific and technological world, a tragic mistake in our technological era.

There are some exceptions. We are happy to have in our country, in a most

responsible position as Chairman of the Atomic Energy Commission, Dr. Glenn Seaborg, Nobel Laureate, great scientist, who is more responsible for the largest extension of the table of elements than anyone else in our time. Above all, Dr. Seaborg is a statesman, a man with great vision. He possesses one of the major qualities for a statesman, the ability to appreciate events, present and future, for their importance in our society. In many speeches and reports throughout this country and abroad, Dr. Seaborg brought, in simple and vigorous words, real hopes, based on scientific premises, and kindled the belief in a better future. It seldom happens that one man combines in himself so many virtues, talents, and qualities. I am a witness to the career of Dr. Seaborg. We have known each other, we discovered today, for 30 years.

SEABORG: Thank you very much, Boris Pregel. I notice that in your program I am referred to as the former chancellor of the University of California at Berkeley. I think perhaps you might have made it a little clearer that I left that position voluntarily.

THE POSITIVE POWER OF SCIENCE

To speak to such a distinguished gathering, and one that over the past few days has immersed itself in matters of such importance, is indeed a challenge. This has been a conference with a difficult and most urgent task—that of considering “the environmental and social consequences of science and technology” and, in the light of these considerations, attempting to “formulate policy goals and strategies for the needs of man.” Of course, the kind of thinking that has been responsible for initiating this conference and organizing its direction and content has been long overdue. Most of us, I am sure, realize that, whatever has been accomplished during these deliberations and discussions, we cannot be too self-congratulatory. There is a great segment of the public that would tell us we are “too late with too little.” And a significant part of that group will go even further and say that we of the scientific community and our work are at the root of much of man’s ills today.

Nevertheless, I am not here tonight to add to the despair and guilt of our times. I am not one who happens to believe that we can degrade the environment less by degrading man more. We are not going to save the earth merely by despising ourselves as its inhabitants any more than we are going to build a better society by belittling ourselves as individuals.

I think it is unfortunate—almost calamitous—that in the often sincere effort to establish a better perspective on our past errors and a sense of proportion about our present powers there are many who feel they have to go to the extremes of demeaning man, of denying reason and downgrading science. Tonight I plan to defend all three. I particularly want to speak up in behalf of science and urge that it rise to the crisis that faces it and man. In a sense, it will be the success or failure of science—science epitomizing man’s extended perception and power—that may well determine his survival as a species. But it is not science as we have used it in the past that will do the job. It must be science as part of a new human philosophy, as part of a new age of enlightenment that we are entering. And it is both the past shortcomings and successes of science that are moving us into the age. Let me explain.

What we are seeing today in all our social upheavals, in all our alarm and anguish over an environmental feedback and, in general, the apparent piling

of crisis upon crisis to an almost intolerable degree, is not a forecast of doom. It is the birthpangs of a new world. It is the period of struggle in which we are making the physical transition from man to mankind—a mankind that will be an organic as well as a spiritual whole on this earth. I see this transition as a natural evolutionary process, a continuation of the growth and growing complexity of life on this planet. I do not believe that this growth is malignant in nature. It will not destroy itself by devouring its host or poisoning itself in its own waste. Neither will it self-destruct after delivering its message. Rather, it will self-adjust through listening to and responding to that message—one that for all the static surrounding it is coming through quite clear.

I would like to touch on several ideas related to my admittedly broad and optimistic outlook for the future. In each case I hope to bring in the relationship of science and technology to the more general idea. First, let me dwell on the subject of growth. This is something that until recently was a major value but of which we now seem to be developing a deadly fear. Both that growth and today's reactions to it, I believe, are natural and necessary. There seem to be many people today who, with no mean amount of eloquent hindsight, deplore the fact we did not, long before now, predict our population growth and our growing productivity, with its accompanying waste, and somehow forecast our current environmental dilemma. Unfortunately, most great minds of the past foresaw only small segments of the evolving problem. And the values of the past were centered about unlimited growth because this seemed to be to the advantage of the individual and his society. In a world of seemingly endless physical frontiers, where the exploration and exploitation of these frontiers by new human creativity generated and fulfilled new human needs and values, few if any could think in terms of limits, balance and stability.

Many of us who today talk so glibly about our use of the atmosphere and oceans as "sinks" and who have embraced ecology almost as fervently as we have become embarrassed with economics, tend to overlook or forget the facts and feelings of the most recent past. It does little good to make scapegoats of our ancestors or of one or another segment of our society for the crises we face today. Our environmental crisis in particular could not have been theorized or accepted in the abstract before. It was an experiment that had to be lived in conjunction with the other problems of human growth that have evolved and which we must now move on to resolve. I think it was inevitable that man had to grow to this point. He is now entering what must be a period of tremendous maturity. And just as there is written within the genetic code some incipient biological mechanism that stops physical growth at a certain point in life, so I believe there is within our evolving mankind a well-coded message that is now being released. Before I go on to discuss some of what that message means, let me backtrack to discuss the role of science and technology in the growth to which I have referred.

It is obvious that for some people science and technology are among the best scapegoats of the time. They are said to be the cause of most of our ills today. By conquering disease and extending life they have been responsible for an explosion of population. By increasing productivity and raising living standards they have been responsible for depleting resources and polluting nature. By expanding knowledge and emphasizing efficiency, they have been responsible for deflating myths and diminishing man. And by placing enormous power in the hands of man they have brought him to the brink of his own

destruction. The list of accusations is endless, and it is not fashionable today to attempt to answer the charges or put the matter in perspective. It is more fashionable to dwell on man's relationship to the natural world, to lament that he is not more like the animal life from which he descended, and to wish for his return to a simpler, perhaps more primitive, existence.

This approach may be more fashionable, it may even contain a certain amount of wisdom we should heed, but it is not the whole message we should be hearing. The major part of that message, I believe, should tell us not to deny our dependence on nature or, on the other hand, to deny our differences from what we left behind in our evolution. It is this recognition of what we are—with all its potential as well as its shortcomings—and the emphasis on what we must and can become that are important. The fact is that in this transitional period from tribal man to a truly organic mankind, and to a world in which we can live in harmony with each other and in balance with our global environment, we need a new level of excellence in our science and technology and a new degree of integration between them.

There is, no doubt, a great deal of pain and shock involved in this transitional period, for we are breaking one set of long-established natural bonds and forming new ones. The whole process of change produces shock, reaction, and readjustment. There is always a tendency to revert, to flee from the new and challenging, before new understanding and confidence allow us to move ahead. We are living through such times. We are experiencing what Alvin Toffler refers to as "future shock," and it is often difficult to sort out our movement and its direction. For example, take note of the action and reaction of our youth as it resists some change with an antirational thrust—and often a flight from reality—while at the same time demanding realization of a new level of idealism that can only be achieved through change, change employing the highest form of rationality.

A similar dichotomy and flux exist in our confrontation with environmental problems. Many feel the need for simplicity, limits, and balance. Yet we know that what we must do to accomplish the goals we express in these terms entails to some degree the mastery of a greater complexity, new growth, and a dynamic rather than static type of balance. We really do not want to freeze the world as it is now or go back to "the good old days." What we want, if I read correctly the ideals that so many of you—and so many deeply thinking and concerned people around the world—feel today, is a world far different than we have ever known it. Today—at this conference and at similar meetings that are being held and organized—we are struggling, fiercely but fruitfully, I think, to clarify our conception of that world and work toward its realization. We must not weaken or lose heart in this struggle.

What will be the outcome when we begin to succeed? What will the evolution of this new mankind mean? And what will be some of the manifestations that it is taking place and succeeding? Perhaps most important, we will see the elimination of war as an attempt to resolve human differences. It will not be only that war becomes untenable as a form of such resolution. Neither will it be only that through the wisest and fullest application of science and technology we will eliminate most of the physical insecurity and want at the root of war. What may be most significant as both a cause and effect in establishing world peace will be a sublimation of man's territorial instincts, and the aggressiveness that is tied to them, to a new feeling, one of the communality of man in the possession of the entire earth. Men are already in some measure

sharing the earth through international travel, communication, and exchange of resources. As this sharing is enhanced by a parallel releasing of the age-old bond of fear of scarcity and adjustments in the economic system we have built to institutionalize that bond, we will begin to see the true meaning of the brotherhood of man materialize. And as this happens, the tribal loyalty that Arthur Koestler has seen as the root of much of man's conflict will be broken and shift to a new global loyalty—a loyalty of man to all his fellowmen.

Concurrently with this establishment of world peace— and, again, as both a cause and effect of it—will be the closing of the chasms between the peoples of the world. Aurelio Peccei, Barbara Ward, and many others have warned us that we cannot live in a world growing apart in the rate of development of its peoples. What I think we must, and will, see is a new concerted effort to raise the standard of living and productivity of the underdeveloped areas of the world while readjusting the growth of what many feel are becoming “over-developed” areas, harming themselves and others by some unwise management of their power and affluence. Anyone fully attuned to the problems of the world today can feel the need for this effort and readjustment. I think it is vitally important that we in scientific and technological fields do everything we can to encourage and work with those social and political forces that recognize this need and are trying to fulfill it. I will have more to say about such cooperative efforts in a moment.

Another manifestation of our evolving mankind will be the reduction, and eventual elimination, of environmental pollution. The organic mankind of which I have spoken could exist but momentarily on this earth if it were to act as a parasite or cancer. It must learn to exist as an integral and contributing part of the earth that up to now has supported it unquestioningly. This can be achieved only by the formulation and application of a whole new scientific outlook and new ecological-technological relationship. This relationship must be based on a nonexploitive, closed-cycle way of life that is difficult to conceive of in terms of the way we live today. We will have to achieve what René Dubos has referred to as a “steady-state world.” We will have to think and operate in terms of tremendous efficiencies. We will have to work with natural resources, energy, and the dynamics of the biosphere as a single system, nurturing and replenishing nature as she supports and sustains us. Such a system can be operated at various levels. A steady-state world does not have to be one in which mankind merely subsists and waits for natural evolution to take place. In fact, a steady-state world would be a challenge and stimulus to man's creative evolution—which I believe we should not deny is a natural process and which may be the highest form of natural evolution. Perhaps the organic global mankind that I have portrayed will be the acme of physical evolution on this planet. And I will not try to speculate beyond this point.

I have no doubt that many people envision the concept of such a complex, efficient, and organic mankind as a nightmare—an anthill civilization in which individuals are mere automatons or mindless cells in a emotionless body. I do not agree with such thinking. What I see evolving is quite the opposite of this. It is a world in which the sphere of freedom of action and choice, individual creativity and sensitivity, is enlarged by the growth and application of knowledge and by greater efficiency and organization. These elements buy time and provide freedom. It is ignorance, confusion, and waste that enslave and eventually destroy.

Of course, new values and greater education must accompany the transition to this type of civilization. That is why I believe that the age of enlightenment we must enter must be one that combines scientific understanding with a new humanistic philosophy. We need both now to survive and grow. What will be the role and direction of science in achieving this new age? I believe this conference offers us a good indication of both. But let me briefly sketch what I feel has been the movement of science and where it is going today.

Science, we might say, has become a victim of its own success. Or to put it more precisely, it has become a victim of its own single-minded success. I think this has happened in several ways. First, in going from the broad and general philosophy from which it originated into a growing number of more precise disciplines—each becoming more productive the narrower its focus became—science traded off wisdom for knowledge and, to some extent, knowledge for information. In recent years this process has been reversed, and we are now seeing the growth of interdisciplinary sciences and a striving for a more all-encompassing grasp of the physical world and even broader relationships, such as you have been exploring in this conference. This type of growth is essential if science is to be the guiding force, as it must be, behind our evolving mankind. Science must grow stronger by continuing to nourish and improve its individual disciplines. We need the specific knowledge they offer. At the same time, it must grow wiser through its correlation of knowledge. And it must be able to transmit its wisdom in the most effective way to society.

We have a tremendous task before us in humanizing the focus and feeling of science while at the same time organizing and rationalizing the forces of humanity. In recent years we have not been too successful in either of these directions. That is the reason why we have been faced, and are faced today, with a decline in the prestige of science, an antirational reaction on the part of many of our disillusioned youth, talk of the "eroding integrity of science," and even a feeling of guilt and despair in much of the scientific community. We must move away from all this. We must work toward a unification of the scientific spirit and a restoration of our self-confidence as well as a new degree of respect for science on the part of those who have lost faith and hope in it.

Let me offer some specific proposals as to ways we might accomplish this. I think we should establish more international interdisciplinary conference—such as the outstanding one we have been attending here—and more organizations that integrate our various disciplines, within and outside of the sciences. I believe these conferences and organizations should bring together—for positive, constructive exploration, discussion, and action—participants of varied interests, opinions, and talents: visionaries and realists, environmentalists and technologists, ecologists and economists, theorists and activists. But the purpose of these meetings should not be that of many of the "confrontations" we are witnessing today. We should seek not the degraded power of polarization but the more beneficial strength of unity—that achieved through recognizing and working toward common goals. In this regard I would like to see those scientists who in recent years have done a great service to man by calling attention to his environmental problems now contribute an even greater service by joining their colleagues in a concerted effort to solve those problems.

I think that out of such conferences as we have held here should come concrete programs or ideas that can be acted on, as well as the broader policy-setting type of recommendations. We must give our activists something con-

structive to act on and encourage the idea that many small positive measures can add up to a significant force. They can develop an important momentum and a spirit that in time can become overwhelming in its total effect.

I think that the information and programs generated at these conferences must be brought to the attention of the public and the world's political leaders more successfully. We have been very unsuccessful in communicating with the public, in bridging the gap between the Two Cultures. Now we must not only communicate, we must involve. We should particularly encourage the participation of youth in scientific and technical activities. Merely to decry their alienation, to speak of their immaturity or their unrealistic, "nonnegotiable" approach to achieving their ideals, is pointless; more than that, it is disastrous. We must at all levels engage them in the realities of life, not in order to blunt their ideals or enthusiasm, but for the purposes of capturing what is good and constructive in them, of harnessing their energy and creativity, of growing with them.

If some sparks must fly between the gap of our generations, let us not use them to ignite conflagrations but rather to fire an engine of human progress. We in the scientific community in particular need our young people working with us, and it is one of the tragedies of our time that so many of them have become cynical about the accomplishments and prospects of science. I believe we can win many of them back, especially by showing them how effective we can be in working toward the solution of our environmental ills. We must prove to them that science and technology are among man's most creative and constructive forces when they are used by creative and constructive men.

Finally, I think that in bringing together the many forces I have referred to tonight, and in emphasizing the importance of their working together, we must establish the leadership and goals to direct and sustain their efforts. Never before has the world had such a desperate need for greatness, for inspiration, for a vision. The cynics today will tell us that any vision we might have now would be a delusion. But I cannot agree. I feel as it says in Proverbs: "Where there is no dream, the people perish." Let us create that dream then and work to achieve it—not only that man shall live, but that mankind shall be born.

* * *

PREGEL: Thank you very much, Dr. Seaborg. And now, I would like to thank you all for coming this evening, and I declare closed this session of the International Joint Conference.